

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

| | |
|--------------------------|--------------------------------------|
| Owner of the Declaration | VELUX Group |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
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| Valid to | 23.05.2027 |

Collar BFX
Velux

www.ibu-epd.com | <https://epd-online.com>



General Information**Velux****Programme holder**

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Declaration number

EPD-VEL-20220111-CBB3-EN

This declaration is based on the product category rules:

Windows and doors , 01.08.2021
(PCR checked and approved by the SVR)

Issue date

24.05.2022

Valid to

23.05.2027



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Collar BFX**Owner of the declaration**

VELUX Group
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2970 Hørsholm
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Declared product / declared unit

1m² underfelt collar BFX

The declared unit is based on the configuration of a standard size window measuring 0.78m x 1.178m.

Scope:

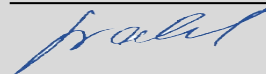
Productline BFX - Collar/installation product; manufactured by VELUX in France for sale in Europe.

Declaration according to *ISO 14025* and *EN 15804* describing specific environmental performances of the construction product. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

| | |
|--|------------|
| The standard EN 15804 serves as the core PCR | |
| Independent verification of the declaration and data according to ISO 14025:2011 | |
| <input type="checkbox"/> | internally |
| <input checked="" type="checkbox"/> | externally |



Prof. Dr. Birgit Grahl,
(Independent verifier)

Product

Product description/Product definition

The VELUX BFX underfelt collar is a product for sale in the European market.

The underfelt collar consists of mainly steel and plastics.

The calculations are based on the BFX underfelt collar. For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *DIN EN 13859-1:2014 - Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing*. For the application and use the respective national provisions apply.

Application

VELUX BFX underfelt collar is used in renovation and new build.

Technical Data

The Declaration of Performance including relevant technical specifications and test methods/test standards can be downloaded from the website www.velux.com/ce-marking.

The performance values are specific for the BFX underfelt collar.

The declared values in the table relate to the reference product. For other covered product variants, specific values can be selected at the bottom of the above-mentioned download page.

Constructional data

| Name | Value | Unit |
|---|----------|--------|
| Fire resistance class DIN EN 1634-1 | E | class |
| Resistance to water penetration before artificial ageing | class W1 | |
| Resistance to water penetration after artificial ageing | class W1 | |
| Tensile strength in longitudinal direction before artificial ageing | 200 | N/50mm |
| Tensile strength in longitudinal direction after artificial ageing | 120 | N/50mm |
| Tensile strength in transverse direction before artificial ageing | 200 | N/50mm |
| Tensile strength in transverse direction after artificial ageing | 120 | N/50mm |

LCA: Calculation rules

Declared Unit

The declared unit is one m² related to a reference window, that the collar is installed in connection with.

The declared unit is based on the representative product measuring 0.78m x 1.178m.

Declared unit

| Name | Value | Unit |
|-----------------|-------|---------------------------|
| Declared unit | 1 | m ² |
| Weight per area | 1.77 | kg/representative product |
| Weight per area | 1.92 | kg/declared unit |

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *DIN EN 13859-1:2014 - Flexible sheets for waterproofing – Definitions and characteristics of underlays – Part 1:*

Underlays for discontinuous roofing.

Base materials/Ancillary materials

| Name | Value | Unit |
|-------------------|-------|------|
| Galvanized steel | 67 | % |
| Polypropylene | 16 | % |
| Polybutadiene | 16 | % |
| Hot-melt adhesive | 0.3 | % |

REACH

This product/article/at least one partial article contains substances listed in the candidate list (date: 17.01.2022) exceeding 0.1 percentage by mass: no.

Recycled content

| Name | Value | Unit |
|--------|-------|------|
| Steel | 10 | % |
| Others | 0 | % |

The values stated in the table relate to the recycled material streams in VELUX production.

Reference service life

A calculation of the reference service life according to *ISO 15686* is not possible.

The Bundesinstitut für Bau, Stadt und Raumforschung/Federal office for building and regional planning (*BBSR*) table declares for the complete roof window a service life dependent on the applied window frame material between 25 and ≥ 50 years. This includes collars and flashings as declared with this EPD.

System boundary

Type of EPD: Cradle to gate - with options. The following life cycle stages were considered:

Production stage A1-A3:

Consideration of the production of raw materials and their processing; transport of major material to the manufacturing site; assembly of semi-finished products to the final product; packaging material (including waste paper input for paper and cardboard).

End-of-Life stage C1, C2, C3:

C1: a manual demolition is assumed, resulting in indicator value "0".

C2: For the transport to EoL by truck a distance of 50 km is assumed.

C3: A scenario for the incineration of plastics in a waste incineration plant (WIP) is assumed.

The EoL-Scenario does not assume waste to be disposed of on a landfill site. Module C4 is declared as "0".

Benefits for the next product system D:

Resulting electrical and thermal energy from the WIP, avoiding the generation of electricity and heat via fossil fuels, is considered.

The amount of metals after the reduction due to the net-flow calculations is sent to a recycling process. The effort for recycling, as well as the benefit for the regained metals are

declared in module D.

Contribution of waste flows is considered in the modules where they occur.

Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The *software GaBi* is used accompanied by the *GaBi background data base* (version 2021.2, 2021).

LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The following declared values refer to the declared unit of 1m².

Information on describing the biogenic Carbon Content at factory gate

The declared biogenic content comprises the paper manual and the packaging material consisting of cardboard, paper and wood. As module A5 is not declared, the information on packaging supports further EoL calculations.

| Name | Value | Unit |
|---|-------|------|
| Biogenic carbon content in product | - | kg C |
| Biogenic carbon content in accompanying packaging | 0.147 | kg C |

The value refers to the following packaging material (per 1m²):
Paper (manual): 0.009kg, Cardboard packaging: 0.329kg,
Paper insert: 0.003kg, PE-LD: 0.009kg

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

Reference service life

| Name | Value | Unit |
|--|---------|------|
| Life Span (according to BBSR) depending on window frame material | 25 - 50 | a |

End of life (C1-C4)

| Name | Value | Unit |
|--|-------|------|
| Collected separately waste type waste type | 1.92 | kg |
| Recycling | 1.29 | kg |
| Energy recovery | 0.62 | kg |

Reuse, recovery and/or recycling potentials (D), relevant scenario information

| Name | Value | Unit |
|------------------------------|-------|----------------------------|
| Steel (net-flow calculation) | 1.63 | kg/1m ² product |

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

| Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Benefits and loads beyond the system boundaries |
|---------------------|-----------|---------------|-------------------------------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| X | X | X | MND | MND | MND | MND | MNR | MNR | MNR | MND | MND | X | X | X | X | X |

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² BFX

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|----------------------------------|-----------|----|----------|----------|----|-----------|
| Global Warming Potential total (GWP-total) | kg CO ₂ eq | 6.69E+00 | 0 | 5.84E-03 | 2.39E+00 | 0 | -3.41E+00 |
| Global Warming Potential fossil fuels (GWP-fossil) | kg CO ₂ eq | 7.2E+00 | 0 | 5.8E-03 | 2.39E+00 | 0 | -3.4E+00 |
| Global Warming Potential biogenic (GWP-biogenic) | kg CO ₂ eq | -5.15E-01 | 0 | -6.9E-06 | 1.26E-04 | 0 | -7.17E-03 |
| Global Warming Potential luluc (GWP-luluc) | kg CO ₂ eq | 3.39E-03 | 0 | 4.73E-05 | 6.48E-05 | 0 | -8.66E-04 |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC11 eq | 5.3E-12 | 0 | 1.14E-18 | 5.47E-16 | 0 | -1.88E-14 |
| Acidification potential of land and water (AP) | mol H ⁺ eq | 1.8E-02 | 0 | 1.14E-05 | 2.79E-04 | 0 | -5.5E-03 |
| Eutrophication potential aquatic freshwater (EP-freshwater) | kg P eq | 3.4E-05 | 0 | 1.72E-08 | 8.34E-08 | 0 | -2.03E-06 |
| Eutrophication potential aquatic marine (EP-marine) | kg N eq | 4.36E-03 | 0 | 4.74E-06 | 7.15E-05 | 0 | -1.2E-03 |
| Eutrophication potential terrestrial (EP-terrestrial) | mol N eq | 4.58E-02 | 0 | 5.37E-05 | 1.28E-03 | 0 | -1.24E-02 |
| Formation potential of tropospheric ozone photochemical oxidants (POCP) | kg NMVOC eq | 1.91E-02 | 0 | 1.02E-05 | 2.08E-04 | 0 | -4.65E-03 |
| Abiotic depletion potential for non fossil resources (ADPE) | kg Sb eq | 2.38E-05 | 0 | 5.13E-10 | 7.96E-09 | 0 | -5.72E-06 |
| Abiotic depletion potential for fossil resources (ADPF) | MJ | 1.24E+02 | 0 | 7.72E-02 | 7.15E-01 | 0 | -4.22E+01 |
| Water use (WDP) | m ³ world eq deprived | 3.41E+00 | 0 | 5.38E-05 | 2.35E-01 | 0 | -6.16E+00 |

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² BFX

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|----------------|----------|----|----------|-----------|----|-----------|
| Renewable primary energy as energy carrier (PERE) | MJ | 4.11E+00 | 0 | 4.44E-03 | 1.53E-01 | 0 | -3.27E+00 |
| Renewable primary energy resources as material utilization (PERM) | MJ | 5.43E+00 | 0 | 0 | 0 | 0 | 0 |
| Total use of renewable primary energy resources (PERT) | MJ | 9.54E+00 | 0 | 4.44E-03 | 1.53E-01 | 0 | -3.27E+00 |
| Non renewable primary energy as energy carrier (PENRE) | MJ | 9.66E+01 | 0 | 7.74E-02 | 2.84E+01 | 0 | -4.22E+01 |
| Non renewable primary energy as material utilization (PENRM) | MJ | 2.77E+01 | 0 | 0 | -2.77E+01 | 0 | 0 |
| Total use of non renewable primary energy resources (PENRT) | MJ | 1.24E+02 | 0 | 7.74E-02 | 7.15E-01 | 0 | -4.22E+01 |
| Use of secondary material (SM) | kg | 3.98E-01 | 0 | 0 | 0 | 0 | 1.31E+00 |
| Use of renewable secondary fuels (RSF) | MJ | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of non renewable secondary fuels (NRSF) | MJ | 0 | 0 | 0 | 0 | 0 | 0 |
| Use of net fresh water (FW) | m ³ | 9.2E-02 | 0 | 5.09E-06 | 5.55E-03 | 0 | -1.46E-01 |

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² BFX

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-------------------------------------|------|----------|----|----------|----------|----|-----------|
| Hazardous waste disposed (HWD) | kg | 1.42E-07 | 0 | 4.08E-12 | 1.28E-10 | 0 | 1.66E-10 |
| Non hazardous waste disposed (NHWD) | kg | 2.13E-01 | 0 | 1.21E-05 | 1.57E-01 | 0 | 2.68E-01 |
| Radioactive waste disposed (RWD) | kg | 4.71E-03 | 0 | 1.4E-07 | 2.95E-05 | 0 | -1.49E-03 |
| Components for re-use (CRU) | kg | 0 | 0 | 0 | 0 | 0 | 0 |
| Materials for recycling (MFR) | kg | 0 | 0 | 0 | 1.04E+00 | 0 | 0 |
| Materials for energy recovery (MER) | kg | 0 | 0 | 0 | 0 | 0 | 0 |
| Exported electrical energy (EEE) | MJ | 0 | 0 | 0 | 5.09E+00 | 0 | 0 |
| Exported thermal energy (EET) | MJ | 0 | 0 | 0 | 9.14E+00 | 0 | 0 |

RESULTS OF THE LCA - additional impact categories according to EN 15804+A2-optional: 1 m² BFX

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|--|-------------------|----------|----|----------|----------|----|-----------|
| Incidence of disease due to PM emissions (PM) | Disease incidence | 1.98E-07 | 0 | 6.94E-11 | 3.32E-09 | 0 | -8.86E-08 |
| Human exposure efficiency relative to U235 (IR) | kBq U235 eq | 1.18E+00 | 0 | 2.05E-05 | 4.02E-03 | 0 | -2.04E-01 |
| Comparative toxic unit for ecosystems (ETP-fw) | CTUe | 7.62E+01 | 0 | 5.73E-02 | 4.86E-01 | 0 | -5.7E+00 |
| Comparative toxic unit for humans (carcinogenic) (HTP-c) | CTUh | 2.9E-09 | 0 | 1.16E-12 | 2.89E-11 | 0 | -1.4E-09 |

| | | | | | | | |
|--|------|----------|---|----------|----------|---|-----------|
| Comparative toxic unit for humans (noncarcinogenic) (HTP-nc) | CTUh | 9.62E-08 | 0 | 6.29E-11 | 2.75E-09 | 0 | -3.45E-08 |
| Soil quality index (SQP) | SQP | 2.4E+01 | 0 | 2.65E-02 | 1.77E-01 | 0 | -2.85E+00 |

Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'.

This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Disclaimer 3 – for 'potential soil quality index'. Due to a data lack in the foreground data of VELUX, the result has a very high uncertainty and refers only to the background data, which contain respective information.

References

BBSR

BBSR, 24.02.2017, Nutzungsdauer von Bauteilen nach BNB

DIN EN 1634-1

DIN EN 1634-1:2018-04: Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows

DIN EN 13859-1

DIN EN 13859-1:2014-07: Flexible sheets for waterproofing - Definitions and characteristics of underlays - Part 1: Underlays for discontinuous roofing

EN 15804

EN 15804:2012+A2:2019, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

GaBi

GaBi Software and GaBi Database by Sphera Solution GmbH, version: 2021.2, 2021

IBU 2021

Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021, www.ibu-epd.com

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 15686

ISO 15686:2011-05: Buildings and constructed assets - Service life planning - Part 1: General principles and framework

PCR part A

Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.2, Berlin: Institut Bauen und Umwelt e.V., 2021

PCR part B

Requirements on the EPDS for Windows and doors, version 01-2021, Berlin: Institut Bauen und Umwelt e.V.

REACH

Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

Regulation (EU) No. 305/2011 (CPR)

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC



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